



REMARKS/ARGUMENTS

Favorable reconsideration of the present application is respectfully requested.

Claims 7-8 have been allowed. Claims 1-6 and 9 were rejected and claims 10-15 were withdrawn from consideration.

Claims 2, 4 and 5 have been cancelled and Claim 6 amended for clarity.

Claim 1 has been amended to further recite that the controller controls the hydraulic device so that the slip rotation speed matches the predetermined slip rotation speed if the slip rotation speed calculated by the calculation portion is less than the predetermined slip rotation speed during the downshift of the automatic transmission. Basis for this feature is found at steps S106, S116 and S120 in Fig. 4.

Claims 3 and 9 have been amended to recite that the controller including a calculation portion that calculates the slip rotation speed of the lockup clutch, and a setting portion that sets the slip rotation speed calculated by the calculation portion as the target slip rotation speed if the slip rotation speed calculated by the calculation portion is greater than a predetermined rotation speed during a downshift of the automatic transmission and sets the predetermined rotation speed as the target slip rotation speed if the slip rotation speed calculated by the calculation portion is less than the predetermined rotation speed during the downshift of the automatic transmission. Basis is found at steps S106, S116 and S118 in Fig. 4.

New dependent Claim 16 recites that the control portion includes a setting portion that sets the slip rotation speed calculated by the calculation portion as the target slip rotation speed if the slip rotation speed calculated by the calculation portion is greater than a predetermined rotation speed during the downshift of the automatic transmission. Basis is also found at steps S106, S116 and S118 in Fig. 4.

New Claims 17-20 correspond to Claims 1, 3, 6 and 16 but recite the calculation, control and setting portions in “means plus function” format. These limitations are therefore governed by 35 U.S.C. § 112, ¶6. New Claim 21 is based on step S120 and new Claim 22 is based on Claim 6.

Claims 1-6 and 9 were newly rejected under 35 U.S.C. § 102 as being anticipated by U.S. patent 6,039,675 (Adachi et al). According to the outstanding Office Action, Adachi et al discloses an automatic transmission including a torque converter having a lock-up clutch, and a controller determines a target slip speed.

Adachi et al discloses a lock up clutch slip control system in which an actual slip rotation speed ω_{SLPR} is caused to approach a target slip rotation speed ω_{SLPT} by applying a “difference canceling lockup clutch engagement pressure” (col. 2, lines 18-31). According to Adachi et al, the actual slip rotation speed ω_{SLPR} is calculated at 32. A target slip rotation speed ω_{SLPT} providing minimum torque fluctuations is calculated at 31 based on the vehicle parameters described at col. 4, lines 35-40, none of which is the calculated actual slip rotation speed ω_{SLPR} . The target slip rotation speed ω_{SLPT} is compared with the calculated actual slip rotation speed ω_{SLPR} at 33, and the difference ω_{SLPER} therebetween is determined. This difference is then minimized by taking the engine output torque t_{EH} into consideration for determining the clutch engagement pressure reference value P_{LUCS} used in calculating the clutch engagement pressure at 37 (Fig. 4; col. 7, lines 5-17). There is no description that the target slip rotation speed ω_{SLPT} is set to be the calculated slip rotation speed ω_{SLPR} , or of comparing the calculated actual slip rotation speed ω_{SLPR} to a reference speed and setting the target slip rotation speed ω_{SLPT} to the reference speed during a downshift of the transmission.

Significantly, the Office Action did not allege that the controller of Adachi et al controls the slip rotation speed of the lock-up clutch in any particular way during a downshift of the automatic transmission. The Office Action instead disregarded the limitations as to the

control of the lock-up clutch during a downshift of the automatic transmission by characterizing them as method limitations (see first full paragraph of page 3).

In response Claims 1 and 3 have been amended to more clearly recite the features thereof as structural features. For example, Claims 1 and 3 no longer use the term "adapted to," and recite that the controller includes a "calculation portion," while the control and setting of Claims 1 and 3 are now recited as being performed by control and setting portions. Claim 9 recites features in "means plus function" format, which is structural according to 35 U.S.C. § 112.

Claim 1 now recites that the controller controls the hydraulic device so that the slip rotation speed matches the predetermined slip rotation speed if the slip rotation speed calculated by the calculation portion is less than the predetermined slip rotation speed during the downshift of the automatic transmission. There is no evidence that Adachi et al provides a calculation portion that calculates the slip rotation speed of the lockup clutch, and a control portion that controls the hydraulic device so that the oil pressure of the lockup clutch becomes constant if the slip rotation speed calculated by the calculation portion is greater than a predetermined rotation speed during a downshift of the automatic transmission, and controls the hydraulic device so that the slip rotation speed matches the predetermined slip rotation speed if the slip rotation speed calculated by the calculation portion is less than the predetermined slip rotation speed during the downshift of the automatic transmission. It is therefore submitted that Claim 1 defines over Adachi et al. This is also true for Claim 17 which recites these features in means plus function format.

Claims 3, 9 and 18 are directed to a feature of the invention whereby the calculated slip rotation speed is set as the target slip rotation speed in a feedback control of the oil pressure of a lockup clutch in an automatic transmission if a downshift of the automatic transmission is executed. This is shown, for example, at step S118 in Figure 4 wherein the calculated slip

rotation speed (calculated at step S114) is set as the target slip rotation speed for the feedback control in the case of the downshift detected at step S106. This is also illustrated in Fig. 5B by the target slip rotation speed taking the value of the calculated slip rotation speed between times T2 and T3. As a result, a deviation in the feedback control during the downshift becomes zero so that a correction amount for the oil pressure of the lockup clutch becomes constant. It is thereby possible to minimize shift shocks and to advance the completion of the downshift (see paragraph [0017]).

There is no evidence that Adachi et al provides the claimed calculation portion or means of Claims 3, 9 or 18 that calculates the slip rotation speed of the lockup clutch, and a setting portion or means that sets the slip rotation speed calculated by the calculation portion as the target slip rotation speed if the slip rotation speed calculated by the calculation portion is greater than a predetermined rotation speed during a downshift of the automatic transmission and sets the predetermined rotation speed as the target slip rotation speed if the slip rotation speed calculated by the calculation portion is less than the predetermined rotation speed during the downshift of the automatic transmission.

The Office Actions states that col. 4, lines 35-45 of Adachi et al inherently teaches that the controller sets a calculated slip rotation speed as the target slip rotation speed if a downshift is executed. This is respectfully traversed. As described above, lines 35-45 of Adachi et al describe that the target slip rotation speed ω_{SLPT} is calculated based on certain vehicle parameters, none of which is the calculated actual slip rotation speed ω_{SLPR} and none of which is related to the execution of a shift. It is therefore respectfully submitted that these claims define over the prior art.

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Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Robert T. Pous
Attorney of Record
Registration No. 29,099